

# COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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The new Videomaster 7000 terminal bears a striking resemblance to a portable TV set.

## \$5,000 Display Terminal Is Compatible With 360

MORRISTOWN, N.J. A general-purpose alphanumeric display system that will sell for less than \$5,000 per terminal and is both hardware and software compatible with the IBM 360 has been announced by Ultronic Systems Division of the Sylvania Electric Products, Inc.

Including a standard alphanumeric keyboard and display monitor, the Videomaster 7000 allows up to 96 alphanumeric characters on a 7x4-in.-screen. The manufacturer points out that the unit occupies minimum desk space, leaving adequate working room for the operator.

Specifically designed to operate with existing software in a remote mode, the system interfaces with a 1200- or 2400-baud communications circuit termiating into an IBM 2701 Type III interface.

The system can operate as a stand-alone terminal, or with clusters of terminals in each remote location, a company spokesman said. Other peripheral devices such as printers or

magnetic tape units may be interfaced with the system, he said.

In addition to the standard editing features, the unit offers both formating and hard-copy options, the spokesman said.

The Videomaster 7000 costs \$4,980, net, and may be supplied in two price levels (\$156 per month for 18 months or \$128 monthly on a 60-month contract). The company indicated that both lease prices include maintenance.

The Videomaster 7000 is the third video-terminal product announced by Ultronic within a year.

First production deliveries for the system have been slated for the fourth quarter of 1969. Initial public demonstrations of Videomaster 7000 will be at the joint Computer Conference and the International Communications Show.

Ultronic's mailing address is Mt. Laurel Industrial Park, P.O. Box 3151, Moorestown, N.J. 08057.

## Viatron to Maintain \$39/Month Pricing

BEDFORD, Mass. Viatron Corp., which started the industry when it announced its \$3.9-million processors last year, believes that it can maintain the \$39/month price for a substantial profit, Dr. Edward M. Bennett told the annual stockholders meeting last week.

"So and so that new products are announced starting at

Mr. Bennett's Joint Computer Con-

ference speech began to make him nervous. He had to leave the podium to get his notes and, while he was gone, the audience heard a speaker say that the fast delivery of 100 working units was expected early in May and that altogether nine semiconductor companies

were among his suppliers. Deliveries of all test arrays to be completed in August. Production orders, he said, for volume delivery of System 21 arrays were to be placed after the testing was completed.

A company must lease to market small-scale general-purpose computers and what he described as "other data processing machines."

Details of the meeting are given in the financial section.

## 360 Random Access Method Said to Be 3 Times Faster

LOS ANGELES An access method claimed to be three times faster than IBM's Indexed Sequential Access Method for either DOS or OS on the 360 has been announced by the System 360 Systems. Intra-hive Features of the new Random Access Method (RAM) include less programming effort and significant operating economies for either random or logically indexed files, a company spokesman said.

### Only \$5,000 for RAM

The RAM package sells for \$5,000, including all documentation, hardware installation (except travel costs), and training. It is completely compatible with either DOS or OS and uses the direct access method for its own I/O.

### Major Advantages

One major advantage in the system is its ability to handle variable-length records, the spokesman said. This permits much more efficient use of the track space available, because the blocksize is fixed at that of the track (or half-track for the 2314). In addition, no space for the file header or overflow is used.

The package is currently operating at two locations in California as the file technique for an

online billing system for utility companies and municipalities. It was developed for this purpose.

### Certain Disadvantages

One noticeable disadvantage is that the actual file is tied to a physical location on the disk. The file is immovable. If an unrecoverable error occurred on

the disk, the data base would have to be reloaded, unless a disk-dump backup existed.

The basic operational improvement is due to the elimination of the index mechanism and its replacement with a track/record address randomizing formula. This formula pro-

(continued on Page 5)

## Disk Controller Attaches 2311s to Small Computers

DEER PARK, N.Y. An unbuffered, compatible disk controller designed to attach IBM 2311s to small computers economically has been announced for delivery later this year by BCD Computing Corp.

Currently the models are being developed for the IBM 1802, but the company intends to develop controllers for other small systems, such as the Interdata and PDP series also.

"We believe that many people want to use packs that are compatible with the IBM 360 system on their small computer systems—but it doesn't make sense to pay \$60,000 for a controller and then put it on a system only worth \$10,000!"

Dan Bowers, BCD president, told Computerworld.

The pricing of the new controllers varies from \$19,000 down to \$9,000 depending upon quantities ordered of each model. Bowers explained that the development cost for a new interface cost about \$10,000, and that this is being divided between the first five machines.

"If someone has one controller built, and later we make another for a different customer, then we will refund some of the first man's money," Bowers said. Operating software is included in the price.

The company is located at 100 E. Industry Court, Deer Park, N.Y.

## \$120/Mo. Stations Input to Tape System

By Peter L. Briggs

CW Senior Writer

WALTHAM, Mass. A key-punch replacement system which costs as low as \$120 per-month per station when eight stations are used has been announced by Viatron for January delivery by its Viatron Key System.

The stations, which feature a visual display, are connected by cable to a control unit. Each control unit can handle up to eight stations.

The price of an eight-station package would be \$960 per month. The unit is on magnetic tape, suitable for direct input to a computer.

The unit, known as the Intelligent Key Entry System, consists of a simple walnut desk, a

Details on Page 3

built-in keyboard and a CRT display.

In appearance, the keyboard closely resembles that of the IBM 029 keypunch.

Immediate Service

"In developing and marketing this product, we acceded to Thomas B. Hirsch, Intertel president, 'the company is committing itself to full support of the user in the field. We intend to provide a repairman within one hour of arrival,' and the machine is designed to allow that serviceman to repair any failure within one hour."

The input devices will lease for \$50 per month and the control unit, capable of handling eight stations, leases for \$560 per month. The purchase price of

the stations is \$12,000 and the controller, including the keyboard, includes the tape drive and a disk memory, sells for \$25,000.

The normal price for a standard keypunch, including card costs, is in the vicinity of \$100 per month.

The new system will be field tested at a large-scale starting this September, and will be available for deliveries starting January, 1970, from the company's new production facilities in Burlington, Mass.

## On the Inside

### Programming-Systems Tie Seen Loosening

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Delivers of the System 21 are

## ADR's Software Complaints Echo Control Data's Hardware Points

PRINCETON, N.J. — Details of the Applied Data Research antitrust suit against Control Data again, interesting parallels between it and the Control Data suit with ADR taking computer software, as opposed to computer hardware, as the area of complaint.

When Control Data talked about "paper tigers," and the damage that had been done through pre-announcements, ADR talks about misrepresentation, development and delivery dates of its software packages, and "premature announcements."

Similarly, where Control Data talked about price cuts to selected markets, ADR talks of IBM setting up "a two dollar price" on the complete software packages supplied to IBM hardware customers.

The main thrust of the accusation is that computer software packages and custom software and services are separate markets that are being merged and are being monopolized by IBM. What ADR does say that IBM has established a monopoly in computer hardware, the complaint shows that that is only a minor part of the company's case, used to show how IBM has created the monopoly in the software area. The size of the software market is not specifically given but has been around \$10 billion over the last 10-year period, according to ADR.

The basis in law of the complaint is that IBM is selling its software only as part of "a single price" bundle which, ADR believes, is forbidden under the Consent Decree. Data also says the actual passage from the Consent Decree forbids IBM from selling one electronic data processing machine only with the sale of another machine. ADR uses the phrase "device" "hardware" and the question as to whether software or a software program is a "device" appears to be the key argument in the case.

A number of specific items in the complaint involved ADR plans which apparently were to be developed and abandoned as a result of IBM competition. ADR said it was developing a package called PDQ (program for descriptive query) for use with IBM 360 hardware to provide an information retrieval system when IBM offered to supply a competitive

package called DPS (document processing system). The point is that DPS was offered at a pseudo zero-dollar price to IBM 360 customers and that as a result, ADR had to abandon its plans to market PDQ.

ADR also accused IBM of prematurely launching the Conversational Remote Job Entry package for delivery in the third quarter of 1970. ADR points out that it has a competitive package under development and that the announcement by IBM of its package more than a year ahead of delivery has effectively damaged the market which ADR might have obtained. Similarly ADR claims that IBM prematurely an-

nounced a flowcharting software package more than a year before delivery to preempt the market for the ADR Autoflow flowcharting system.

In connection with this ADR also claims that IBM deliberately and falsely advertised the 360 flowcharting package by claiming that the flowchart pages are planned automatically.

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### DATA COMMUNICATION IDEAS?

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Phone: 206-634-8766.

## Details of the Key Entry System

By Peter L. Briggs  
CW Staff Writer

**WALTHAM**, Mass. — A new data-entry device, known as the Intelligent Key Entry System, has been announced by Infors, Inc. The device combines the features popular with key-to-tape units and cost-performance approaching that of a standard keypunch at eight or more stations.

### Includes Most Features

The new device includes most of the features available with current equipment including: backspace, key verification, check digit facilities, high-speed left-zero insertion, auto-dup, auto-skip, quietness, convenience, stored programs, and display capability.

In addition, however, several new features have been added: sight verification of entire records, extensive forms of display capability, job batching to facilitate several operators working on the same job at different times, and total control which can be accumulated from any desired fields and displayed at the end of a job for batch verification, and a displayed character count for each record.

All of these features are included as standard with the system.

### Forms Capability

A major ability is the display of an input form in the form of a series of tables which, when combined with the format control program, allows the operator to use the terminal exactly as an on-line display, and when used, fill in each field as it is needed.

It is possible to define up to 240 forms and store them on the disk memory buffer.

### Record Retrieval

The control unit consists of a

"temporary" disk memory with space for a large amount of data.

The data is stored under a job number, allowing later searching or retrieval of either an entire record or individual records within a job through the use of a matching search key.

When the operator decides that a job is complete, she signals the unit to write the job onto the tape and clear that area of the disk.

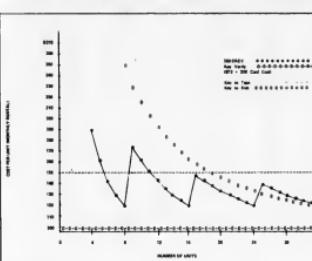
### Component Description

The unit itself has its own control and programming logic, with microprogramming for all activity. Extensive error-recovery procedures are built-in allowing 32 re-attempts to write to a record on disk or on tape, should a transient error occur.

The unit writes fixed-length records in multiples of 128 characters up to 512 characters. With a display ability of 128 characters plus the "form" capability, the user is able to enter data, make edits, feed, to perform a great deal of more complicated work in less time and with less effort on a single station.

The output tape is either 7- or 9-track, and variable density, can accept any standard tape reel to 2400 ft in length. The tape can be written in several densities, 200, 556, and 800.

An optional on-line capability will be introduced later this year which will permit the bypassing



A per-unit comparison between the Intelligent Key Entry System and other input systems, as supplied by Infors.

of the tape stage and direct transmission to a computer from the disk buffer. No prices are currently available for this capability.

Arthur W. Heinrich, chief engineer, points out that no revolutionary ideas in hardware or

circuitry have been introduced for this device. It is built upon reliable, workable, and maintainable hardware, all of which is built specifically for this device. The construction is completely modular, to facilitate maintenance.

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## State's EDP, Consultant Costs to Be Scrutinized

**BOSTON** Estimates of \$10 million to \$20 million are the figures stated by the principals in the investigation of expenditures in the Commonwealth of Massachusetts for computers and computer consultants, according to Rep. Gerald W. Cohen (D-Brockton) who has been concerned over this problem for some time.

A mandate was issued by Senate President Maurice Donahue (D-Holyoke) last month by unanimous action of the legislature, calling for a bipartisan investigatory committee comprised of three senators and five members of the House. The committee is required to present its report by June 1.

### No Apparent Controls

The major questions raised involve the necessity for the use of the computers by different state agencies, the apparent lack of competition between the computer services, and the apparent lack of state control over the consultants, some of whom, it is claimed, have paid fees in excess of \$50 per hour.

The Office of Program Planning is currently compiling a thorough inventory of computers used by state agencies and the consulting work the agencies have had performed. The report was intended to be complete by the end of May.

Cohen said that until the OPP report was complete, it would be unknown just how much unnecessary money was spent, but he estimated that the amount would run from \$10 million to \$20 million over the last year. "Everyone who knows how to spell EDP is a consultant nowadays!" he said.

Another complaint raised by several legislators was the al-

leged practice of consultants developing a system for Massachusetts and then selling it to other states. Cohen said, "We're educating them and we've been paying for it."

He further said that the apparent lack of state control had contributed to the extensive costs of consulting services. Ordinarily, state agencies are required to let competitive bids for this type of service and then deal with the lowest bidder.

Some question has been raised on this point, since it is not necessarily the lowest bidder who can offer the least expensive service.

The costs of poor design and programming, Cohen said, cost more than the costs of having the programs and systems developed in the first place, according to one industry figure.

One point which Cohen noted was that the state's Information Commissioner, Anthony F. DeFalco, one of former Gov. John A. Volpe's closest aides, worked for an EDP consulting firm prior to joining Volpe, and has returned to this business since Volpe's return to Washington.

Cohen described this fact as "very interesting."

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## Univac Pioneers Plan Gathering At Spring Joint

**NEW YORK** — A meeting of the Univac Pioneer Friendship and Fellowship Association will be held Thursday, May 15, at the Statler Boston Hotel. Cocktails will be served from 5-7 p.m. and off. Univac members and whether or not still with the company — will be welcome on payment of \$5 to Noel Zakin, who will be at the hotel.



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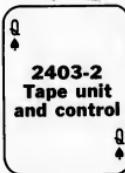
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## 2 Agencies Back Computer Bill

WASHINGTON, D.C.—Two important government agencies supported the new Brooks bill for the use of computers in Congress during last week's hearings of the House government operations subcommittee. The Bureau of the Budget and the Controller General's office offered testimony favorable to H.R. 404, and Rep. Jack Brooks, D-Texas, said that he was encouraged over the chances of final approval during this session. He pointed to the recognition throughout Congress of the need to apply modern data-handling techniques to the legislative process.

Under the Brooks proposal, responsibility is given the controller general to develop and maintain the computer capacity

required by the House and Senate and the subordinate offices of Congress. It is proposed that the controller general will cooperate with the director of the Bureau of the Budget in developing a compatible computer system to support the budget and appropriations cycle in the legislative and executive branches of the government.

Under this approach, the data

processing and information system to be developed for Congress would not duplicate the system presently being developed by the Bureau of the Budget. The objective would be to develop a supplementary system to serve the particular needs of Congress yet be compatible with the system being developed by the Bureau of the Budget for budgetary and fiscal data.

**Faster Access Method Is Offered**

(Continued from Page 1) duces the physical address of a record on the disk by calculating it from the logical key. The formula chosen has about 7% synonyms (cases where the address chosen by the formula will not directly locate the record

and it must be found by the link addresses) when 80% of the capacity of a given volume is used. For each synonym, the number of accesses per record goes up to 1.3.

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# Couplers Allow Paper Tape, IBM 2741 with MT/ST •

HARTFORD, Conn. — Couplers designed to extend the output capability of IBM's Magnetic Tape "Selective" Type writer to include paper tape and the 2741 data terminal have been announced by Connecticut Technical Corp.

The Model DC-201 data coupler's primary purpose is to permit direct conversion of the data contained in MT/ST cartridges to computer and/or communications-compatible punched paper tape. The MT/ST must be modified to accommodate the auxiliary output connector on the cartridge reader.

The unit measures 18-1/2 in. by 25 in. by 10-1/2 in., and is said to weigh 35 lb.

The company quotes a price of \$4,250 for the basic system, plus

options including code change for paper tape equivalent of MT/ST code, and unit color and power (if not standard 60 Hz).

The DC-201 and DC-202 hook the MT/ST to an IBM 2741 data terminal. The DC-201 operates as a terminal and robot keyboard operating unit, the DC-202 through direct line couple.

DC-201 is priced at \$2,500, the DC-202 at \$3,500.

Connecticut Technical Corp., 300 Main St., Hartford, Conn. 06120.

## Display and Keyboard

A new display and keyboard terminal combination, with optional IBM-compatible magnetic tape capability, has been announced by Computer Consolers, Inc.

## New Products

The Model 520 display and keyboard has a character set that includes 26 alphabetic, 10 nu-



meric, and 23 punctuation and special characters. Display is on a 14 in. CRT.

The optional magnetic tape capability is said to include one or two 900-bpi, 9-channel units, fully compatible with IBM 360 Models 30 through 75. A 1/4 in. tape, for data punch, is used as a key table, formats, or repetitive letter texts, also optional. The company says that a system can include either pairs or mixed-tape units.

The 9-channel tape is said to store up to 280,000 characters/reel, and to read or write at 1600 characters/sec. It can also store at 556 characters/sec.

Tape blocks can be as large as the 960-character buffer memory. Verification of input is possible, if desired. An additional feature allows the user to search a tape for a key word.

For communications, a 202C

data set or equivalent may be used.

The basic unit, consisting of the 520 keyboard and display, and 724 control unit, costs \$1,995 with a monthly lease price of \$252 per month. The 9-track tape unit and control lease for \$235 per month over three years.

Computer Consolers, Inc., 31445, Main St., East Rochester, N.Y. 14445.

## Entry/Retrieval System

An entry/inquiry/retrieval system, said to operate at nearly ten times standard Teletype speed, is being marketed by Computer Terminals, Inc.

The Model TK340 transmits voice-grade data from one to four keyboard display stations, interfacing a 202D modem.

The terminal is said to operate in both polling and command modes. The company says that it can overlay an image from a video camera on information on the CRT.

The system, which has been demonstrated in operation with a Burroughs B500 processor, is said to cost \$1,500 less per operator than deliverable competitive systems.

Delivery is stated to be four months after receipt of order.

Computer Terminals, Inc., Paragon Park, Minneapolis, Minn. 55435.

## Ruggedized Varian 620i

A ruggedized version of the Varian 620i computer is now available for mobile applications where vibration, shock, humidity, and other environmental factors may be a problem.

The ruggedized 620i is said to weigh under 100 lb. It is designed to meet the shock requirement of 5G, 11-msec hammer blows, perpendicular and horizontal, and to operate in an ambient range of -40° to 55°C, in humidity up to 100%.

Varian Data Machines, 2722 Michelson Drive, Irvine, Calif. 92664.

## Decimal Converter

An octal-to-decimal converter, in the form of a circular slide



## The computer world discovers the free-talker

### Data entry under format control without record length restriction

The long and short of it is this: programmed format control of data entry is provided by a program cassette. Data from the electronic keyboard is recorded directly on a

second cassette. Record length can be selected for the most efficient data entry, free from machine or media restrictions.

Your operator can right or left justify and blank or zero fill with ease... and the system can even do a self skip. Dropped records can be inserted or errors corrected during verification. She does this... and much more at increased efficiency of up to 33% over keypunch.

Cassette tapes are later converted to one-half inch computer tape which is readable at 800 bpi interchangeably on seven or nine-track tape drives.

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rule, is being marketed by Science Spectrum, Inc.

It is designed to perform both conventional arithmetic and scientific calculations, including combinations of addition, subtraction, multiplication, division, squares, and square roots. Logarithms and exponentiations are also included.

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Science Spectrum, Inc., 2613 De La Vina St. (P.O. Box 300), Santa Barbara, Calif. 93105.

## British Liberties Council Calls Data Banks 'Threat'

LONDON — Computers represent a serious threat to privacy and individual freedom, according to the National Council for Civil Liberties here.

The Council, the British equivalent of the American Civil Liberties Union, is mounting a national campaign to warn the public against what it calls the "growing computer threat."

Particular attention is being paid to the spread of national data banks in which information on every citizen's private life can be stored.

They fear that once registered by a computer, for right or wrong reasons, a person might never be able to escape.

### Time-Sharing Monopoly

Later this year the Post Office will take over Britain's telephone service. Critics charge that the Post Office is trying to establish a monopoly over all forms of communication, including computer time-sharing, in addition to the traditional post, telephone and telegraph services.

Other critics have warned that the computer offers possibilities for mail tampering and telephone tapping.

### Police Data Bank

A new police computer is expected to go into operation in 1972, and the Council charges that this means a new era of state surveillance in Britain.

As originally publicized, the computer would enable the police to find out within 60 seconds if someone had been stolen, if its occupants were wanted by the police.

But the computer can also store information on people who have no criminal record, or who have never had any contact with the police, according to Alastair Hetherington, editor of the *Guardian*.

Similar systems are in operation in the United States, and an effort has been made to prevent their introduction in the Kansas City. Most police departments use such a system [CW, Feb. 12], and they claimed that the privacy of law-abiding citizens is fully protected because only people with criminal records can be put into the system. But this does not preclude the possibility of including law-abiding citizens in the future.

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**Editorials****Come to the Spring**

Do you remember the computer industry two years back? At that time there was competition in mainframes — and competition in magnetic-tape supplies.

Of course, disk packs, disk drives, tape units, etc. were not a competitive market, and as for software . . . But just look at the situation now. Software is coming out in almost as many different colors and varieties as terminals. New printers are appearing constantly, adding tremendously to the freedom of output format, and the industry is much more flexible and able to meet specific needs.

Keeping up with the Joneses may be difficult — but keeping up with computers is nearly downright impossible.

It would be impossible if it weren't for the Spring and Fall Joint Computer Conferences.

If you're not planning to come to Boston next week, think twice. Don't you need to know more about the industry than you did two years ago?

**Loaded Words  
and Loaded Computers**

When Caxton invented printing, a technological revolution was born. During the period immediately afterwards, the fruits of the revolution were ascribed — and correctly so — to Caxton. After all, there were many writers but few printers. And so the printer, rather than the author whose words he printed, got the credit. Even today we talk of Gutenberg Bibles, etc., as a reminder of that age.

And so it is with computers. When they were first created, there were many programmers but few systems, and so the result of the computer-programmer combination was credited to the rarity, which was then the machine.

But this is no longer true, and the legacy which ascribes all the credit to a piece of hardware is a dangerous one. It depersonalizes our industry and consequently often frightens people. It confuses logical arguments and may stand in the way of solving the very real problems that the computer poses.

It also deprives the programmer of the credit that is his due. Just imagine the cry that would go up if the printers' union decided henceforth that all books would be known, not by their authors, but by the printing press that created them! This is the size of the credit due to programmers which currently is being usurped by the machine.

CW feels that there is an urgent necessity for either creating or adapting a new word to describe a computer loaded with a program — exactly as a book describes the combined work of the printer and the author. Or, if this is not possible, then the term "computer" should be accepted in its present popular meaning and replaced by some other word ("hardware," perhaps) to describe the more "engineering tool" which is the technical meaning of the term "computer."

**Welcome to  
an Unorganization**

One of the delightful pieces of news in this week's paper is about a Univac Pioneers Friendship and Fellowship Association gathering. Despite the ponderous name, the gathering is specifically not — not, they tell us — to be an organization. Hurrah for the Pioneers (may their memories of the 19th and Allegheny never fade — at least not until Thursday, May 15).



'I Don't Think Lawyers Should Report to Engineers—  
Even If We Do Have to Keep Our Stories Compatible!'

**Software Costs****Are They 3%...22-1/2%...or 10%?**

The problem of separate pricing for hardware and software has many possible solutions. One of the problems is that in the breakdown of the customer's dollar is not well understood. Recently, International Data Corp. published in the *EDP Industry Report* an internally developed analysis from available sources as to where, in its opinion, the IBM rental dollar goes and how IBM allocates the costs to the various products. IDC points out that in its publications have quoted 3% as the software development cost to the manufacturer and notes that, in the first table, this is, in fact, the cost of software development (see item 8). However, when this plus customer support (including systems analysis and application programs) is looked at as an allocation to customers, IDC believes that the total value of the software, as the IBM customer sees it, accounts for 22.5% of the cost.

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6. Administration (includes overhead and personnel) . . . . .	1.0 cents
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10. Maintenance . . . . .	10.0 cents
11. Profit . . . . .	20.0 cents

ESTIMATED ALLOCATION OF COSTS TO CUSTOMERS		
	Total	% of Total
Equipment (Manufacturing and Engineering + 1/2 Software Development)	44	58.5
Software (Customer Support-Sales + 1/2 Software Development)	8.25	11
Customer Support-Custom System Analysis	8.5	11.5
Customer Support-Education	1.75	2.5
Maintenance	12.5	16.5

One way in which IBM could reduce the split percentage of costs would be by using different profit levels for each separately priced item. International Data Corp. noted in its report that unless IBM is prevented from doing so by the Justice Department, it may not establish similar profit objectives for each item. Hardware would probably carry a significantly higher profit objective, with customer services and software having lower ones.

In the analysis, hardware, therefore, might be given 75-80% of the total bill to the average customer, rather than 58.5% on the straight pro rata basis. This would reduce the software figure, in IDC's opinion, to around 8-10% with similar profit objectives.

**Letters to the Editor****Reader Defends ACM's Use Of Same Auditor Each Year**

I am an interested and amused spectator in your feed with ACM. I am neither a present nor past member of ACM.

However, I am a CPA and, as an "amicus curiae," I believe that your article on the "good business judgment to appoint the same auditor on a recurring basis, as long as he appears to be competent to handle the audit." The reason for this is simply that audit fees are based on the time it takes to audit financial records, and some of the audit fees, is, quite naturally, spent "getting acquainted" with the organization and its unique accounting problems. That time can be saved on "repeat" audits.

C.H. Wiese III  
Project Analyst  
Iowa-Illinois Gas & Electric Co.  
Davenport, Iowa

Wiese is quite correct — from the point of view of obtaining inexpensive audits. However, according to the ACM rules, the function of the audit is twofold — one part of which is to obtain financial safeguards independent of executive authority, in this case the ACM audit. The main method of obtaining this is to employ an auditor which was clearly anticipated that ACM was prepared to pay the additional costs involved to get the independence. The technique of making the outsider practically an insider is simply an evasion. Ed.

## Bridging the Generation Gap - Part 3

# Pure Digitals May Vie With New Language Systems To Bridge Gap

In previous articles in this series, we have looked at the history of the Burroughs Corp. series. This system apparently has managed to bridge the generation gap in a way that no other computers have, and this has been done primarily by banning the use of assembly-level programs.

It has, however, cost the user in some ways. It has involved him in trying to find new methods of evaluating his computer's performance and in waiting, if necessary, until a problem was fully caught up with the capabilities of the hardware. And it has marked him as a pioneer, which is not always an advantage.

On the other hand, it has benefited him by allowing programs to be automatically updated to newer versions of software.

In the history of the B5500, a number of these updates have occurred, including the provision of communications programs, reentrant programs, and time-sharing without the programmers or their programs being disturbed.

### Still Unique Case

However, the history is still that of a pioneer. No computer manufacturers outside the Burroughs Corp. have adopted the same philosophy, possibly because the marketing strategies for their systems have always involved them in providing assembly-level capability.

Under these circumstances, it is clear that the appearance of the B5500 in the future has yet to be decided even though the first machine was announced over eight years ago. This article brings out some of the points that may be involved in the decision.

### Unique Digital Processor

The key item in the 500 systems is that digits are not the basic element, but that programs are. Unlike other systems for which the user had to provide coded instructions, who programmed was meaningless; the 500 systems allow only high-level language or meaningful programs to be used. In some ways, it can be argued that this means that the 500s are, in effect, digital computers. They are instead program processors, or problem processors, or some other as yet unnamed type. This is a serious issue.

The digital processor was obviously chosen from the start. The hardware could do so much, but it had to interface with the human immediately outside the hardware. The problem of converting the information from human understandability to machine understandability was not regarded as any responsibility of the system. This was indicated in the selection of the word "digital." Everything had to be translated into code.

Clearly, a program processor like the B5500 challenges, by its

very existence, the continued use of digital processors for many years to come. It is obviously of value in leaving the user responsible for the intricate changes involved in programming (with all the error-prone characteristics of that profession) if it is not necessary. It appears that it is not necessary, but only in the sense that it is not necessary when the standard languages can produce programs as efficiently as needed.

It is probable that there will always be some cases in which assembly-level programs will be required. In fact, therefore, purely digital computers will continue to have values that a language computer cannot have. But as software techniques become better and as users become more sophisticated, the demand for digital computers, as we have seen in the past, is likely to decrease, and to divide into two separate demands — one for digital processors and another for computers designed to be language processors.

From an engineering point of view, the digital computers can, in fact, handle the languages. But currently it is not clear that they can handle the conversion from generation A to generation B.

With this in mind, let us look at a guaranteed capability to keep programs painlessly up to date. How important this is going to be in the future will depend on user reactions, and they are hard to foresee. In many ways the user will depend upon how many assembly programs continue to be used.

Installations which have successfully purged themselves of assembly-level programming will form a ready market for manufacturers who can produce language processors. However, most such installations are appearing, but even now they are only a small percentage of the current market.

But computer markets are often made up of small percentages, and so it appears to be reasonable to assume that, for enterprise manufacturers to decide to gain new orders from installations of competitors which are using high-level languages.

To do this he will have to offer some kind of guarantee. In case of failure, offer service because once the computer software is installed, the cost of supporting it is not great. Now the industry has expertise in preparing operating systems and compilers, but more probably he will have to be looking on aiming at a specific segment of the market which is using a particular language such as Cobol.

He will probably design a Cobol system which will output programs for general-purpose digital computers instead of the Cobol system. Or perhaps he would go for a scientific market by offering a matrix-capability system. This might be designed for the installations that currently spend hours on a single

program, inverting and reverting large-scale matrices.

The computer user can go after more by designing the internal parts of his computer to perform these functions unusually well, while trusting that the general-purpose computer will not be able to do as well. Standard Computer's Systems

To a certain extent this is happening already with the Standard Computer's systems. These can be tuned to the application to quite an extent, but in general, the tuning has been done more by the customer rather than by a selected heading of the design work on the computer.

This would encourage the possibility of the creation of a number of specialized computers. Unlike the ones we have today, these would be built on one side to the general-purpose computer because they would share the same languages, and on the other side to the single-purpose computers that are normally dedicated to a single program. In the end, they would challenge the unity of the industry more seriously than any of our present systems.

And it is quite possible that they will get the chance.

### Designers Are Watching

The point, however, does seem to be that the user needs to know that computer designers, looking ahead into the future, will not be able to guarantee that these systems will not appear. So they will pay particular attention to providing their support to as few as possible to the general-purpose computer as hard as they can manage.

It seems probable, then, that the general-purpose computer, in order to avoid the threat posed by the Burroughs 500, and to meet the needs of the market, the same outward appearance.

We may well see systems advertising as being Cobol machines or Fortran machines, even while they still have the capability of handling assembly-language programs. Equally, large-scale attention will be paid to the problems of compatibility between generation A and generation B.

### Users Should Gain

From the user's point of view, then, while it is by no means clear that there will be any major user reaction to the Burroughs systems — except that Burroughs will probably continue with them — it also seems most probable that he will get more efficient conversion techniques and more efficient high-level programs than he might if the threat of the language processors were not implicit in the current situation.

He probably will see systems that look more and more like the user's own language interface, and will himself have less and less to do with the nitty gritties involved in the operating systems, and will be able to concentrate more and more on getting correct and timely results, which is welcome news.

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## Small Boys Helped to Big Hits by EDP

ATLANTA — A computer is now programmed to help small boys get the big hit that wins the baseball game in the bottom of the ninth, with two out, the bases loaded, the championship hanging in the balance, and their father watching from the stands.

Ray Espinosa's computer works for the Little League in Sandy Springs, a suburb of Atlanta.

Espinosa is president of Atlanta Data Processing, Inc., which rents the Honeywell 120 computer system. He also is president of the Sandy Springs Little League, Inc. where his 12-year-old son, Mike, plays second base.

### 650 Players on Tap

The Honeywell computer keeps track of 650 players on 45 teams in seven leagues, figures batting averages, and schedules each team's games (20 per season) according to field, date, time, and umpire.

Perhaps most important, the computer rates each boy's ability in the most objective way possible.

Tryouts are held in early March, and about 200 new boys come out for the Little League season. The computer then is put to work for the tryouts, and each boy is sent through a series of workouts to test his batting, throwing, speed, agility, and general knowledge of baseball.

About 18 contestants are selected, and rate the boys on a scale of one to four. These ratings are collected, punched on computer cards, and fed to the computer which comes up with the names of Boys with the best one or two (service and good) normally make the major leagues.

The rest are sent for seasoning in the minors.

The Honeywell computer also has been used for work off a list of volunteer adults. Parent Time Saver.

"The scheduling job alone used to take two weeks to figure," Espinosa says, "not to mention all the countless hours the mothers in the Women's Auxiliary put in typing up the finished schedule. Now the computer does the whole job in about a day." Espinosa developed the scheduling program for the 1968 season and offered it to the Little League without cost. It went so well that he expanded the program this year to handle the ratings for the tryouts and to compute a running record of each boy's batting average.

Now he has offered the entire program to any Little League president in the United States.

"Any bona fide Little League president may obtain this program free of charge for the 1970 season with shipping and materials the only cost involved," he says. "Any league president can order the tape and obtain all the information pertaining to this program."

Espinosa may be reached at Atlanta Data Processing Service, Inc., 6 Perimeter Parkway, Atlanta, Ga. 30341.

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This small gourmet restaurant, with a seating capacity of only 120, houses an IBM 1130 computer in its wine cellar to control an inventory of 2,000 different foodstuffs, to provide a running audit of sales and receipts, and

to prepare guest checks automatically.

Jack Schindler said, "The IBM computer relieves us of the day-to-day burdens of managing a business so that we may concentrate on personalized guest service."

Cited by Holiday Magazine as one of the country's outstanding restaurants, Pere Jacques specializes in French cuisine and has an international clientele from as far away as Paris and the Philippines Islands.

The computer, Schindler said, "has been assigned those impersonal chores which do not add to guest care or satisfaction. When the waiter takes an order, emphasis is on recording information for the chef, rather than detailing a guest check for later billing."

"Each meal," he said, "is prepared individually which allows guests time to enjoy fine wines or other beverages, and relax before dinner is served."

### Computerized Check

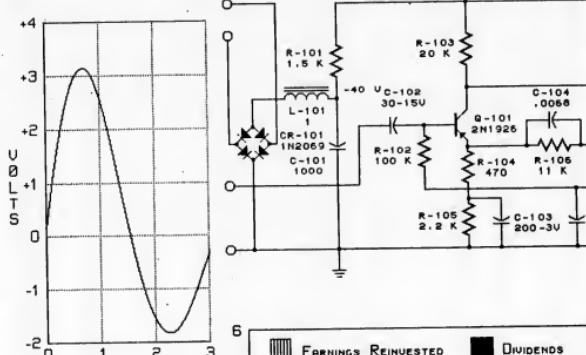
As items on the menu are ordered, a simple identifying notation is made by the waiter. (Each item is preceded by a three-digit number.) At the conclusion of the meal, these numerical codes are keyed into the computer through its typewriter keyboard.

The computer converts the numbers into a printed, itemized guest check, including item quantities and prices. It also totals the guest check and adds the correct tax, all automatically.

"In addition," Schindler said, "the 1130 reduces the items from our inventory and performs a nightly revenue-total and audit."

"Within minutes of the close of business each night, we know if available cash and credit balance with recorded revenue. Errors are spotted immediately and not allowed to be compounded with repetition or the passage of time."

"In addition to providing a nightly audit, the 1130 also produces our monthly financial statements. On the close of business the last day of each month, all critical records of the restaurant are updated, ready for analysis," he said.



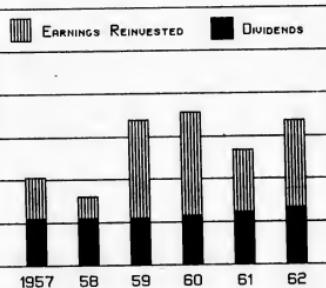
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THESE CHARACTERS ARE NOMINALLY 10 UNITS HIGH BY 7 UNITS WIDE. SOME CHARACTERS ARE 1 UNIT WIDE AND OTHERS ARE 9 UNITS WIDE.

THESE CHARACTERS ARE NOMINALLY 10 UNITS HIGH BY 6 UNITS WIDE. THE HEIGHTS VARY FROM 6 TO 14 UNITS. THE WIDTHS VARY FROM 1 TO 9 UNITS.

THESE CHARACTERS ARE NOMINALLY 6 UNITS HIGH. THE WIDTHS VARY FROM 1 TO 7 UNITS.

### PPA MEETING NOTICE

Mr. Richard Jones, President of both Applied Data Research, Inc. and the Association of Independent Software Companies, will be the speaker at the May 7 meeting of the Professional Programmers Association. The topic for the evening will be "Software Patents and Separate Pricing."

Place: Town and Campus Lounge  
1040 Morris Avenue  
Union, New Jersey

Time: Wednesday, May 7, 1969  
Social Hour 6-7 p.m.

Dinner: 7 p.m.

Speaker: 8:30 p.m.

Members: \$4.00

Non-members: \$5.50

For further information call: (201) 667-7622 or write PPA, P.O. Box 1173 - Union, N.J. 07083

## SMIS Adds Six Institutions As New Members

CHICAGO — Six firms have joined the Society for Management of Information Systems (SMIS) as institutional members.

The firms are: Consolidated Software, Inc.; The First National Bank of Chicago; Information Systems Dept.; Information Management Facilities; Inc.; Lear, B. Knight & Associates; R.E. Moll Associates; and The Pillsbury Co.

At its executive council meeting held in Chicago on March 31, the society added two new members: Bert L. Clegg, Executive Vice President, Joseph F. Cunningham, Deputy Director, Federal Bureau of the Budget; and W. Robert Widener, president of Information Management Facilities.

The society was formed to aid in the exchange of technical information and to provide an interdisciplinary forum for MIS directors, top-level executives served by MIS, educators in graduate schools of business, MIS research personnel, and members of the general public interested in MIS.

Those wishing more information should contact Richard E. Dooley, Secretary, Society for Management Information Systems, The First National Bank of Chicago, 38 Dearborn St., Chicago, Ill. 60690.

## San Francisco To be Scene of CSSL Conference

FRANCISCO — A Conference on Applications of Continuous System Simulation Languages will be held June 30 and July 1 in San Francisco at the Sheraton-Palace Hotel.

The meeting is concerned with the digital simulation of the dynamics of continuous systems, those mathematically represented by differential equations.

Specifically, it is concerned with applications for the simulation of systems in which the means of solution has been one of the new breed of continuous system languages.

The conference is sponsored by ACM, IEEE, Share, and SCI.

For registration information contact Michael Burwen, Basic Computing Arts, Inc., 2680 Bayshore Frontage Road, Mountain View, Calif. 94040.

## Adapso to Mark 8th Anniversary

NEW YORK — The Association of Data Processing Service Organizations, Inc. (Adapso) will celebrate its eighth anniversary during its 26th Management Conference, June 19 and 20 in Miami Beach, Fla.

The program, which will highlight management and marketing techniques, is open to Adapso members and nonmembers.

Information regarding the program may be obtained by contacting Adapso, 420 Lexington Ave., New York, N.Y. 10017.

May 9-10, Flushing, N.Y. — Humanities and Computers Symposium. Contact: Joseph Raben, Queens College of the City University of New York, Flushing, N.Y. 11367.

May 9, New York — International Computer Programs, Inc. Software Seminar. Contact: ICP, Inc., 2511 E. 46th St., Indianapolis, Ind. 46205.

May 13, Watertown, Mass. — Keydata Institute Symposium on Interactive Graphics. Contact: Registrar, Keydata Institute, 108 Water St., Watertown, Mass. 02172.

May 15-16, Atlantic City — Bank Automation Association of Delaware Valley Spring Seminar. Contact: Robert Muller, Bank Automation Association, P.O. Box 687, Atlantic City, N.J. 08401.

May 22-23, Boston — Technical Forum Associates, Inc. Symposium on Information Systems for Planning and Control. Contact: A.J. Collis, Technical Forum Associates, Inc., MIT Box 153, Cambridge, Mass. 02139.

May 23, San Francisco — International Computer Programs, Inc. Software Seminar. Contact: ICP, Inc., 2511 E. 46th St., Indianapolis, Ind., 46205.

## \$5 MILLION AVAILABLE NOW TO BUY 3RD GENERATION COMPUTERS.

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## PDP-10 can handle 63 users simultaneously.





## Computer Installed

Capabilities of the newly installed IBM 360/30 at Computer Age Institute, Fairfax, Va., is demonstrated to Judy Binns by Dr. Thomas R. Hansen, superintendent of the Altoona Area School District.

# Computers Help Increase Scores On Scholastic Aptitude Tests

ALTOONA, Pa. — Computers are credited with boosting scores on Scholastic Aptitude Tests here according to Dr. Thomas R. Hansen, superintendent of the Altoona Area School District.

In the problem-solving mode, computers have helped students learn faster, higher scores because it forces a problem-analysis approach to teaching and learning, instead of the mem-

orizing process, which Dr. Hansen claims is good for general mathematics instruction.

Scores of 600 were considered very good in the Altoona public school system three years ago. Now, scores in excess of 700 are not unusual among mathematics and science students.

The system was begun in 1964 as a small government-financed instructional unit for 200 vocational students. Now plans are underway to convert the General Electric computer system, which consists of 18 teletype/pewriter remote terminals, to Datasset-760 visual display units.

What originally started out as basic vocational instruction in computers has expanded into three computer projects: computer technology for the vocational-technical high school; computer-assisted instruction in mathematics and science; and unit record instruction for business students.

The Altoona district schools (11,000 them) offer a two-year course in programming worth 1-1/2 credits per year.

Dr. Hansen said that, "Schools within the whole Commonwealth of Pennsylvania should be linked together with a network like this — eventually even the whole country."

## What a memory.

### What a system.

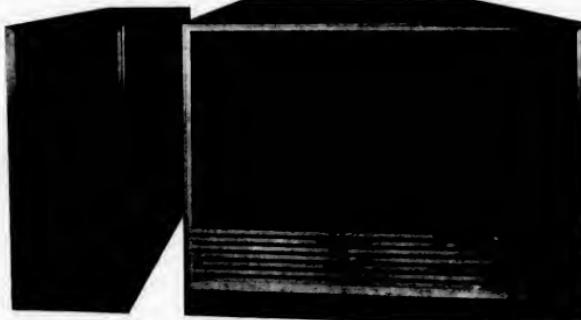
Digital's PDP-10 and Bryant's 2-A disc file. The most versatile system available for time-sharing, batch processing and real-time operation all at the same time.

The 2-A disc file provides unlimited on-line storage for the PDP-10 at the lowest possible cost per word. In fact, Bryant has the best overall performance ratio of any memory system in the industry.

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## New Literature

A four-page brochure describes how to obtain profitable computer sales. It details the features of the ICS real-time approach. Included are descriptions of services, procedures, concepts, and capabilities. Information Control Systems Inc., 1910 E. Madison, Ann Arbor, Mich. 48104.

Three new brochures have been published to describe the techniques of commonly-used methods of credit authorization, the principal features of the NCR 5 sales register, and the use of the NCR Creditline to authorize credit.

Request Bulletin ST-5000-27, SP-164, and SP-1440 respectively.

Public Relations Dept., The National Cash Register Co., Dayton, Ohio 45409.

A 21-page color catalog describes tab products, label holders, and dividers. Each product is illustrated by a photo and outlined in terms of availability, length, width, etc. M.B. Teller, Col-U-Dex, Inc., P.O. Box 54, New Windsor, N.Y. 12550.

*How to Get Answers About Your Questions About Teletype Equipment* is a new brochure containing abstracts from publications showing company background, product information, application information, and histories of actual Teletype equipment installations.

Dept. SP-81, Teletype Corp., 5555 Touhy Ave., Skokie, Ill. 60076.

# Job Control and Cost Accounting Handled by New S/360 Package

**DEER PARK, N.Y.** — A new job-control and cost-accounting package for S/360 computers has been developed and released by Computech, Inc. here.

The package, designed to facilitate the handling of computer installations of any type, according to Donald E. Lee, company president, provides several management-oriented reports describing exactly what runs have been made, when, where, and the type of utilization made for each computer in an installation.

Computech, as the program is called, is installed in a specific computer and runs under O/S. It prohibits use of the computer without proper description of

the program on the JOB card, and keeps accounts of reruns, test runs, production runs, and programming times.

At the end of a running day, reports are printed and printed which tell management what programs have been run; the programmer responsible; the operator; the shift during which it was processed; the start, stop, and completed times; the type of run; and, if applicable, the cause for rerun.

The detailed reports include system by shift and total for hours used for production, for hours, for testing, for preventive maintenance, for terminal and for waste because of hardware

failure, software failure, or operator error.

Optional reports for management can be run on any desired basis by operator, by operator, by shift, by programmer, job, and department; production by operator; hardware, software, or operator failure by subject, department, or job; rental usage by customer; and maintenance costs.

In addition, the system prohibits use of the computer by unauthorized persons or programs through carefully selected information on the JOB card. If the identification is not present, the system will not allow access to information stored on the disk files, then a program is not entered into the job stream. This also assures that no one can use the computer without being accounted for, Lee told Computerworld.

The price for the package is by model of the S/360. Hence the price for a Model 25 is \$2500; M30, \$3100; M40, \$4000; M50, \$5000, etc.

The company, offices located here at 98 E. Industry Court, intends to expand their operations-information system to include other products within the near future, according to Lee.

Lee pointed out that this is not really a "package," but is tailored to the needs of specific operations.

Indac-8 Configuration here is built around a PDP-8/I computer



with 4,096 words of core memory with each word containing 12 binary digits.

## Compiler-Level Software For PDP-8 Process Control

**MAYNARD, Mass.** — Compiler-level software is now being offered for the process and industrial control environment for small computers with Data Equipment Corp.'s new Indac-8 system.

The system used the DEC PDP-8 family of small computers and is aimed at the process control market. Prices start at about \$20,000.

The software for the system includes a compiler/monitor combination for real-time control applications and programming, the company said.

The language supported is Fortran-like, giving the power of the system to implement logically stated requirements. Engineers with a Fortran background can directly program the system for any desired job, without the problem of interfacing with a third-party programming operation.

The hardware required for the system includes a PDP-8/I or PDP-8/L computer with 4K words of memory and a real-time clock, a Teletype, a 32KB disk-storage unit, and a 32-channel analog-to-digital converter.

The software can be expanded to incorporate almost any device, according to the company, and this requires no work on the part of the installation. The monitor will compensate for any type of interface supported by the computer.

The company feels that this basic market for this type of system includes the petroleum industry, manufacturing, utilities, and the aerospace and research industries.

"I've got lots of data... but no information!"

If information you need for day-to-day decisions is being hoarded by your IBM 360, Spectra 70, or IBM 1401 computer, investigate

### EASYTRIEVE 300

Product Software by MSS

EASYTRIEVE is an information retrieval and reporting system that bridges the gap between computerized information files and executives, managers, and supervisors (with or without computer experience) requiring access to the files for day-to-day business decisions.

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- May 7, Detroit
- May 8, Chicago

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**MR. SHELTON T. KATZ**  
Vice-president

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## Material Status Reported By New Purchasing System

By C.W. WALTERS

**MOUNT KISCO, N.Y.** — A new purchasing control system which can generate several types of reports for management control of material flow has been developed to run on "all third-generation machines," according to Computer Usage Co., the developer.

The system produces purchase order reports, as well as open material commitment reports, material order status inquiry, and

material performance reports.

Optionally, the system can be used to issue quality evaluation reports by type of material and supplier, and quality status reports with defect analysis.

The price for the system is in the range of \$20,000 to \$30,000 plus implementation costs, according to CUC. The company pointed out that this is not really a "package," but is tailored to the needs of specific operations.

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## **Short Interest Decline In Both Major Markets**

**NEW YORK** — Short interests on the nation's two major securities exchanges declined as of April 15 to their lowest aggregate levels since September 1967.

Computer-related issues generally joined the trend, although several stood strongly in opposition. Leading the dissidents, with substantially larger short interests, were Lessco common, Data Products, and Levin-Townsend Computer, all showing increases near or above 30%. Lessco warrants, on the other

Short sales represent shares

During the time between sale and replacement, the seller must himself pay dividends declared to the buyer.

**Short transactions** are so noted on exchange books at the time of the transaction.

Many traders believe, however, that shorts have an overall good effect on the prices of individual issues, since a short sale represents an automatic future de-

The following tables summarize the short interests of over 20,000 shares, or issues in which there was a net change of 10,000 shares or more, during the month under review.

month under review	New York Stock Exchange
Addressograph	21,244 30,408
Multic	27,733 23,017
& Dev	
Amplex Corp	55,015 44,107
Automation	44,236 57,564
Bunker Ramo	27,631 36,886
Burroughs Corp	66,973 64,948
Collins Radio	38,421 54,963
Control Sciences	50,709 46,471
Control Data	183,500 220,758
Honeywell Inc	41,621 65,630
Intertel Corp	39,488 68,839
Memorex Corp	20,444 45,841
Nat Cash Register	
Raytheon Co	24,540 33,780
Sanders Assoc	24,717 25,577
Siemens Corp	41,423 29,000
Sperry Rand	117,330 111,828
Systems	
Sperry Univac	45,893 47,243
Kerr Corp.	178,572 137,244

American Stock Exchange

	4-15-69	3-14-69
Astrodata Inc	89,724	89,994
Callif Computer	28,600	37,525
Prod		
Computudyna	28,900	31,682
Computer	22,717	43,807
Leasing Co		
Condec Corp	5,835	16,552
Data-Control	22,311	11,054
Systems		
Data Process	70,463	110,522
Fin Gen		

If you are moving, please be sure to notify the Computerworld circulation department. To guarantee continued service, we request that you send us an old address label with your new address at least two days in advance.

### **Viatron Reports 14,000 System 21 Orders**

**BEDFORD**, Mass. — Viatron suffered a net loss of \$1,254,000 during the year ended Oct. 31, 1968, and an additional \$906,000 during the quarter ended Jan. 31, 1969, according to Edward M. Bennett, president and chairman at the annual meeting held last week.

Bennett went on to state that the company's level of spending had increased substantially, and would continue to rise during the rest of this year.

Bennett attributed the large outlays to the cost of designing, developing, and manufacturing masks for MOS arrays, and to other costs expected in business startup.

The MOS development is expected to cost Viatron in excess of \$1,300,000, Bennett said.

The company is working with

The company is working with

nine semiconductor companies each is expected to deliver the first 100 units of each array along with the masks, which serve in much the same fashion as production drawings.

The company says it plans to be able to produce about 1,000 total assemblies per month, with the objective of delivering some 5,000 systems per month by this time next year. The excess over 1,000 is to be assembled by subcontractors.

Viatron's media-oriented marketing effort was said to have been successful, to the tune of a backlog of about 14,000 systems, which consist of microprocessors and related equipment.

The marketing effort is six months old.

To date, the company's sales have been on a letter-of-intent basis.

Bennett said that the company encourages a customer to take initial delivery of a small number of systems, for evaluation and possible follow-on orders. The company says that certain

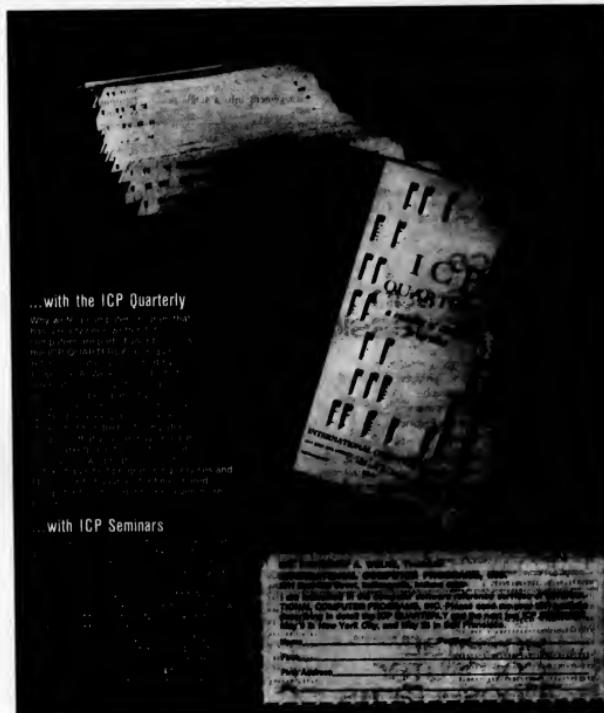
customers foresee a potential usage of 5,000 to 10,000 systems, if initial units are completely adequate.

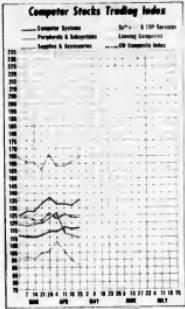
A market that would support the manufacture of "substantially more than 10,000" of the System 21 units during the first year was the company's criterion for proceeding with the development of MOS arrays.

Viatron expects to show

"striking new capabilities" at the Spring Joint Computer Conference.

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## Market Features Leasing Lows, Software Swings

By A.B. Williams

CWS Staff Writer

Leasing stocks started again – up on the plus side during the week ended April 25.

On the Amex, seven issues in the sector hit new 1969 lows during the week, then sprang back nicely.

Only Microchip, Datronics, Rental, Leasing, and Computer Exchange ended the week on the plus side in their group, but the damage to the sector index was relatively nominal, thanks to the recovery toward the end of the week.

Stocks in the Computer Systems area showed strength. Good gains pushed IBM, Honeywell, and Systems Engineering to new highs. Overall, the group rose 4.19 (3.16%) to close at 136.96.

### Peripherals Mixed

Results in the peripheral group were mixed, with good gains in Xerox, Teletype, and Mohawk countered by new lows in Alphanumeric and CelComp.

The Supplies group was largely on the up side, with a very slight gain in the index. Adams Mills hit a new early low, then rebounded to close up 1-3/8 for the week.

The Software & Services sector closed down less than 2%, but was highlighted by some wide swings.

Computer Sciences continues to climb, the issue gained 7-1/4 to a close of 70, hitting a new high during the week.

University Computing was hit hard again, going to a new low for the year. The company's recent good performance, closed up 7-1/2 in a new high of 29.

Overall, it looks like a trading-dominated market. Recent weeks have been marked by some rather precipitous drops in a number of issues followed by fast technical rallies.

## Computers: What's their future?

The special Review and Forecast issue of *EDP Industry Report*, just published, contains a valuable analysis of the explosive computer industry at a time when there are significant transitions occurring in the EDP market.

Among the issue's features are careful analyses of IBM and the other major computer manufacturers ... industry shipment projections through 1975 ... a presentation of trends to watch for in the industry.

This Review and Forecast issue will bring you up to date on the computer industry.

One of the twenty-four issues published throughout the year, this issue can be yours for \$9, or as a free bonus with your subscription — \$75/yr. Write:

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## COMPUTER STOCKS: TRADING SUMMARY

WEEK ENDED APRIL 25, 1969

COMPUTER SYSTEMS

EXCH	1969 CLOSING PRICE	WEEK % CHG.	WEEK % CHG.
N	25-PPB 4-8 1/2	BOURGEOIS CORP.	+ 1 3/4 - .71
N	69-46 68 3/8	COLLINS RADIO	+ 1 5/8 - 2.48
N	100-10 10 1/2	COMPTON CORP.	+ 1 1/2 - 1.17
A	175-112 152	CORAL COMPUTER	+ 4 8/8 - 5.58
N	93-15 15 1/2	CYBERNETIC EQUIPMENT	+ 1 1/2 - 1.17
N	69-75 75	DATA GENERAL	+ 1 1/2 - 1.17
N	100-10 10 1/2	DELTACORP INC.	+ 1 1/2 - 1.17
N	319-291 317 3/4	IBM	+ 1 1/2 - 3.85
N	100-10 10 1/2	INSTRUMENTATION	+ 1 1/2 - 1.17
N	48-41 40 7/8	IRCA	+ 1 1/2 - 1.17
N	50-37 37	RATHENAU CORP.	+ 1 3/8 - 2.36
N	119-83 116 3/4	SCIENTIFIC DATA	+ 4 3/8 - 5.58
N	22-18 18 1/2	SOUTHERN COMPUTER	+ 1 1/2 - 1.17
A	32-28 31 3/4	STATENS ENGL. LABS	+ 1 1/2 - 3.77

PERIPHERALS &amp; SUBSYSTEMS

EXCH	1969 CLOSING PRICE	WEEK % CHG.	WEEK % CHG.
N	75-45 73 1/4	AGGRESSOR/HULL	+ 1/4 -.34
O	71-33 38 1/2	ALPHATECH	+ 1 1/2 - 1.17
O	100-80 80 1/2	AMTEK CORP.	+ 1 1/2 - 1.17
O	19-16 16 1/2	SOLO, REINHOLD & NEW	+ 1/2 -.94
A	37-27 31 3/4	ALPHATECH	+ 1 1/2 - 1.17
A	38-23 23 1/2	CALCOMP	+ 1 1/2 - 1.17
O	38-23 23 1/2	COMPUTER EQUIPMENT	+ 1/2 -.64
A	27-16 14 3/4	DATA PRODUCTS CORP.	+ 1/4 -.15
O	82-46 46 1/2	DATA SYSTEMS	+ 1/2 -.85
O	87-59 59 1/4	ELECTRONIC MEMORIES	+ 1/2 -.85
O	37-29 29 1/2	FABRINTON INC.	+ 1/2 -.15
O	91-15 15 1/2	FLAMECO INC.	+ 1/2 -.15
O	21-18 18 1/2	HILL-ELECTRONICS	+ 1/2 -.21
O	79-59 73 3/4	INNOVATE DATA SCI.	+ 1 1/2 -.91
O	100-75 75 1/2	INSTRUMENTATION	+ 1/2 -.15
O	58-74 68 1/4	PHOTON INC.	+ 1 1/2 - 6.48
O	100-75 75 1/2	RECOGNITION EQUIP.	+ 1/2 -.32
O	82-18 18 1/2	RICOH ELECTRONICS	+ 1/2 -.15
O	85-55 64 1/2	TELETYPE ASSOCIATES	+ 7 11.88
O	270-241 256 1/2	XEROX CORP.	+ 16 1/2 - 8.44

SUPPLIES &amp; ACCESSORIES

EXCH	1969 CLOSING PRICE	WEEK % CHG.	WEEK % CHG.
O	27-26 39	ACME VESICLE	+ 1 3/8 - 7.88
O	23-23 23	ADAMS-MILLIS CORP.	+ 1 3/8 - 7.88
O	24-24 24	BALTIMORE BUS FURN.	+ 1 3/8 - 7.88
O	44-35 37 1/2	DATA DOCUMENTS	+ 1 1/4 - 3.45
O	87-59 59 1/2	DATA FORMS	+ 1 1/2 - 3.85
O	185-94 186 3/4	DATA CO.	+ 1/4 -.05
O	34-24 24 1/2	DATA FORMS	+ 1/4 -.05
O	24-24 24 1/2	DATAFORMS	+ 1 1/2 - 1.17
O	78-73 73 1/2	STANFORD REGISTER	+ 1/2 - 1.17
O	99-96 96 1/2	UNISON	+ 3 1/2 - 3.00
O	29-26 26 1/2	UNIVERSITY MICRO	+ 1 1/2 - 1.17
O	32-29 31 1/2	WALLACE BUS FORMS	+ 1 1/2 - 1.17

SOFTWARE &amp; ED. SERVICES

EXCH	1969 CLOSING PRICE	WEEK % CHG.	WEEK % CHG.
O	14-12 12 1/2	ADVANCED COMP. TECH.	+ 1 1/4 - 13.51
O	34-31 33 1/2	APPLIED DATA RES.	+ 1/2 - 1.17
O	100-90 90 1/2	DATA PROCESSORS	+ 1 1/2 - 1.17
T	71-63 71 1/2	AUTOMATIC DATA PRC.	+ 1/2 - 1.17
O	12-10 10 1/2	AUTOMATICS SCIENCE	+ 1/2 - 1.17
O	3-2 2 1/2	DATA PROCESSORS	+ 1/2 - 1.17
A	31-14 14 1/2	COMPUTER APPL.	+ 1/2 - 3.05
A	100-90 90 1/2	COMPUTER SYSTEMS	+ 1 1/2 - 1.17
O	47-34 35	COMPUTER NETWORK	+ 1/2 - 1.17
N	71-45 45	COMPUTER SYSTEMS	+ 1 1/2 - 1.17
O	37-31 31 1/2	COMPUTER USAGE	+ 1/2 - 1.17
O	15-11 11 1/2	COMPUTER WORKSHOP	+ 1/2 - 3.03
O	17-11 11 1/2	DATAFILE	+ 1 - 7.14
O	38-27 27 1/2	ELECT. COMP. PROG.	+ 1 1/2 - 4.68
O	24-18 18 1/2	INFORMATION	+ 3/4 - 5.33
O	99-15 15 1/2	INSTRUX CORP.	+ 1/2 - 1.17
O	14-12 12 1/2	NAT COMP. ANALYSTS	+ 1/2 - 1.17
O	100-90 90 1/2	PROGRAMMING & STDS.	+ 1/2 - 1.17
O	14-12 12 1/2	REALTIME	+ 1/2 - 1.17
O	37-16 16 1/2	STRATEGIC STDS.	+ 1/2 - 1.17
O	29-11 11 1/2	TEC CONS. INC.	+ 1/2 - 1.17
O	14-12 12 1/2	UNIVERSITY DATA CENTER	+ 1/2 - 1.17
O	14-12 12 1/2	UNIVERSITY CORP.	+ 1/2 - 1.17
O	14-12 12 1/2	U.S. TIME-SHARING	+ 1/2 - 1.17

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EXCH	1969 CLOSING PRICE	WEEK % CHG.	WEEK % CHG.
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O	18-9 9 1/2	COMPUTER EXCHANGE	+ 2 20.88
O	100-90 90 1/2	COMPUTER LEASING	+ 1/2 - 1.17
O	14-9 9 1/2	CONT. COMPUTER	+ 1/2 - 1.17
O	10-10 10 1/2	DATA PROCESSORS	+ 1/2 - 1.17
O	16-16 16 1/2	DATAFONIC RENTAL	+ 1/2 - 1.17
O	14-12 12 1/2	DATAFONIC SYSTEMS	+ 1/2 - 1.17
O	14-12 12 1/2	DIACOM INC.	+ 1/2 - 1.17
O	28-19 19 1/2	DISPLAY EQUIPMENT	+ 3/8 - 1.24
O	54-38 38 1/2	LEASED DATA PRINTER	+ 1/2 - 1.17
O	100-90 90 1/2	LEVIN-TOMIZAWA CORP.	+ 1/2 - 1.17
O	57-34 34 1/2	LEVIN-TOMIZAWA CORP.	+ 1/2 - 1.17
O	14-12 12 1/2	MANAGEMENT ASSIST.	+ 1/2 - 1.17
O	14-12 12 1/2	NCC LEASING	+ 1/2 - 1.17
O	43-37 37 1/2	RANDOLPH COMPUTER	+ 1/2 - 1.17
O	14-12 12 1/2	RENT-A-COMP	+ 1/2 - 1.17
O	22-18 18 1/2	U.S. LEASING	+ 3/4 - 3.06

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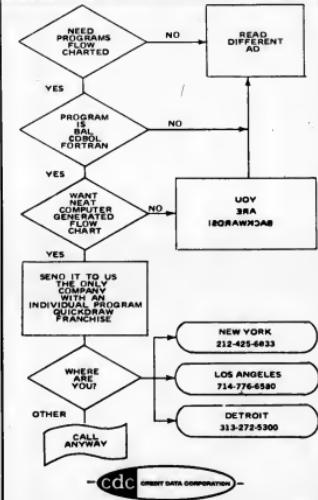
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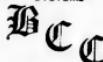
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